GEOMETRIC MODEL DATABASE FOR USE IN UBIQUITOUS COMPUTING

ABSTRACT OF THE DISCLOSURE

5   A system and process for providing a geometric model database for use in an ubiquitous computing environment. In general, the geometric model database system and process is capable of accepting information about the geometric state of the environment, building a geometric model of this environment, maintaining and storing the geometric model, and handling queries

10   about the environment's geometric state. The task of building a geometric model begins by establishing a set of entities that are of interest in the environment. An entity represents an object which exists in the physical world. In the geometric model database, an entity is represented by a coordinate frame and an extent. Extents refer to the physical size, or some service region such as a

15   field of view, associated with an entity. The location of an entity in the physical world is defined using "measurements". In general, a measurement is simply a mathematical description of the geometric relationship between two entities. More precisely, a measurement describes the position and orientation of one entity's coordinate frame, expressed in terms of another entity's coordinate

20   frame. Measurements originating at an entity's frame are expressed in terms of that frame. While various mathematical representations of the geometric relationship between entities could be employed, a preferred one characterizes a measurement as the relative position, and the relative orientation or heading, of two entities along with a covariance matrix which describes the uncertainty in

25   these values.